I. C. 7059 MARCH 1939

UNITED STATES
DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, SECRETARY

BUREAU OF MINES
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INFORMATION CIRCULAR

SAFETY AT THE BATON ROUGE REFINERY, STANDARD OIL CO. OF LOUISIANA

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ERIC H. BROWN

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UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

SAFETY AT THE BATON ROUGE REFINERY STANDARD OIL CO. OF LOUISIANA 1/

By Eric H. Brown 2/

INTRODUCTION

The Baton Rouge refinery of the Standard Oil Co. of Louisiana is one of the largest and most complete establishments of its kind in the United States. Most of the crude oil is transported to the refinery by pipe line, and 100,000 barrels daily are transformed into a wide range of petroleum products. During 1936, 20,638 tank cars were loaded with petroleum products and shipped from the refinery; also 29,173,745 barrels (42's) of petroleum products were handled across the refinery docks for shipment by tank steamer and barge. 3/ Normally, there are about 4,200 employees, but at this writing there is an additional temporary force on construction work. The refinery is served by the Louisiana and Arkansas, the Missouri Pacific, and the Yazoo and Mississippi Valley Railroads.

Promotion of safety plays a very important part in the operation of the refinery, and considerable effort is made by the management to prevent accidents. The organization of a general safety committee in 1919 was probably the first definite step taken in the accident-prevention work. The initial training in first aid was in 1923 when 730 employees of the Baton Rouge refinery were given the training by the Federal Bureau of Mines, and this training has been continued as a definite part of the accident prevention program. Since 1919 the safety organization and activities have been increased gradually so that now an extensive safety program is in effect. The purpose of this report is to describe some of these activities and the progress made in decreasing accidents. The assistance of the management through the safety department in giving the writer the opportunity to study the activities and in making available the accident statistics is gratefully acknowledged.

SAFETY DEPARTMENT

The Safety Department was organized in 1920 and until April 1938 included the safety engineer, assistant safety engineer, safety inspector (also first-aid instructor), and clerk. On May 1, 1938, the safety engineer was appointed manager of the personnel department, which includes employment,

1/ The Bureau of Mines will welcome reprinting of this article, provided the following footnote acknowledgment is used: "Reprinted from Bureau of Mines Information Circular 7059."

2/ Supervising engineer, Bureau of Mines Safety Station, Birmingham, Ala.

3/ Figures published in The Stanacolan on interesting facts about the company.

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safety, training, and the annuities and benefits activities. A new safety director was appointed, and the assistant safety engineer was placed in charge of the coordination of the various training activities sponsored by the personnel department.

The safety director is responsible for the promotion of accident prevention in the plant and the interpretation of safety rules and decisions concerning safe or dangerous practices. He also presides over certain meetings and committees.

The safety inspector and first-aid instructor presides at meetings of the workmen's safety committee and the colored workmen's safety committee. His duties also include changing bulletin boards each month, assisting with the investigation of accidents, making certain inspections, and supervising company first-aid contests and classes.

THE GENERAL SAFETY COMMITTEE

The general safety committee was organized in 1919. This committee guides the safety program of the refinery in cooperation with the safety department. The committee consists of approximately 35 men, every one of whom acts in a supervisory capacity and represents a separate department. It is the usual practice to change at least part of the committee personnel at the end of every 6-month period. Meetings are held every 2 weeks with the safety director presiding. Reports of accidents and zone inspections are read and discussed. Most matters pertaining to plant safety are considered by this committee.

Workmen's Safety Committee

The workmen's safety committee consists of 19 or 20 workmen, every one representing his own department. This committee meets every 2 weeks, with the safety inspector presiding. Suggestions for improving safety conditions and practices in the plant are made by the workmen at these meetings. The suggestions are noted and at the next meeting a report is made concerning the action taken to correct the conditions. The personnel of this committee is changed every 2 months, so that a greater number of the employees may have an opportunity to take an active part in accident-prevention work. On occasions safety talks are made by visitors at these meetings.

Colored Workmen's Safety Committee

About 20 percent of the employees are colored, and in April 1937 the colored workmen's safety committee was added to the safety program. The safety inspector also presides at these meetings, which are conducted once a month. The personnel consists of about 10 workmen, each representing a department in which colored labor is employed. Members serve on this committee for a 2-month period.

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Foremen's Safety Meetings

There are no regularly scheduled meetings of all the plant supervisors, but such meetings are called occasionally to convey some particular message from the management.

Departmental Meetings

Each department holds its own safety meeting every 2 months. The head of the department presides at these meetings, which are attended by all foremen and key men in that department. Departmental safety matters may be discussed and suggestions received, or safety rules may be discussed.

First-Aid Training

First-aid training is a definite part of the safety program, and undoubtedly this has been one of the greatest factors in the reduction of accidents. This training has been conducted with the cooperation and direct supervision of the Federal Bureau of Mines. It was begun in 1923, when 400 employees were trained in May and 330 others in October of that year. This instruction has been continued at intervals since then, and an extensive campaign in 1930 resulted in more than 99 percent of the employees at that time receiving the full course. That year a number of company employees took the instructors' course, and the training was conducted on the cooperative plan. Between 200 and 300 employees annually receive additional training by practicing and taking part as team members in company first-aid contests.

In 1937, the Bureau of Mines instructors' course was repeated for a class of white employees and given for the first time in the refinery to a negro class. This training resulted in 17 more employees qualifying as provisional instructors by training between 600 and 700 new employees in the first 2 months of 1938.

In 1933, a 2-hour review course in first aid was started by the company and was attended by 50 percent of the employees. This was repeated in 1936 and 1938, when approximately 33 and 50 percent, respectively, attended. The Bureau of Mines assists in conducting these classes but considers a 2-hour review course inadequate and therefore does not award additional cards or certificates for this training.

In addition to first-aid training being a factor in preventing accidents, it has resulted in the direct saving of at least three lives by artificial respiration in the refinery since 1927 and a number of others outside the refinery. Five employees have been awarded the President's Medal of the National Safety Council. Certificates of Honor from the Joseph A. Holmes Safety Association have also been presented to a number of the employees for heroic or meritorious safety achievement.

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First-Aid Contests

Until 1937, company white and negro first-aid contests have been conducted semiannually. In the white contests, 18 to 20 refinery teams and 4 or 5 invited teams from other companies participate. In the negro contests, 10 or 12 refinery teams with one visiting team compete. The teams are divided into A and B groups; the A group includes experienced teams, while the B group includes teams with not more than three experienced members. Prizes are awarded for the highest average scores for the two contests each year. Refinery employees who have had past experience in first-aid teams act as judges in the company contests. The winning team in the white division represents the refinery at the annual contest held in Shreveport, La., and sponsored by the Lowe-McFarlane Post No. 14, American Legion, and the Federal Bureau of Mines. The refinery team was the winner of this contest in 1937 and 1938.

As long as the Federal Bureau of Mines conducted the International Mine Rescue and First Aid Contests, the winning refinery team was a contestant. These contests were discontinued in 1930. The Baton Rouge refinery team, which competed in the International First Aid Contest held in Salt Lake City, Utah, in 1923, was the first team from the petroleum industry to participate in these contests. This team was not placed among the winners; but at Pittsburgh in 1927, the Baton Rouge team ranked third, and at Butte, Mont., in 1928, it won second place.

Immediately after the recent first-aid training campaign of new employees a contest was held in which 21 novice teams competed. The members of these teams had just completed the 15-hour course and had no other experience. Starting in October 1938 company contests will be held annually and will include a group of novice teams, as well as A and B groups.

Holmes Safety Chapters

The Holmes Safety Association is a branch of the Joseph A. Holmes Safety Association, which was organized in 1916 by 24 of the Nation's leading technical societies and mining organizations to perpetuate the memory of Joseph Austin Holmes, the first Director of the Federal Bureau of Mines. The Holmes Safety Association consists of local safety chapters and in some instances State or district safety councils, usually organized by members of the Safety Division of the Bureau of Mines in the mineral and allied industries. The Baton Rouge refinery sponsors two of these chapters, organized in 1923 and 1924. The Stanacola Chapter serves the white and the Secola Chapter the colored employees.

The Stanacola Chapter has a membership of more than 2,000 and is supported financially by the payment of annual dues of $2.00 per member. Regular monthly meetings are held in Baton Rouge. They are open to the public, and each meeting is attended regularly by 300 to 500 persons. At special meetings, which are well-advertised, 1,200 to 1,500 people have attended. Two meetings each year are limited to members, and certain

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invited guests; these meetings are a Dutch supper held in the spring, and the annual banquet held toward the end of the year. This chapter is the largest in the Holmes Safety Association and accomplishes much in the promotion of safety, not only among employees, but also among other citizens of Baton Rouge. Programs at the meetings include entertainment, first-aid demonstrations, moving pictures, and speaking. Twenty-five attendance prizes are donated each month by various merchants in Baton Rouge. Only members are eligible to receive prizes. After realizing that more accidents were happening to employees while away from work than while actually in the refinery, the Stanacola Chapter started the "off-the-job safety committee" in February 1937. The membership consists of approximately 70 men who were picked for outstanding support of safety and first-aid activities. The activities include monthly letters written to every employee calling attention to off-the job hazards and methods of eliminating them, compiling accident statistics and facts of accidents occurring off the job to employees; and conducting first-aid training for citizens of Baton Rouge. A radio program from Station WJBO is broadcast once a month. A one-act safety play, "An Evening at Home", also has been given by employees before eight outside groups comprising about 4,000 people. Meetings of the committee are generally held before the regular chapter meetings. As approximately 30 percent of the accidents to employees off-the-job are automobile accidents, the work of this committee therefore has developed into a community problem. In 1937 there was a decrease of 27 percent in off-the-job accidents compared with 1936, due largely to the work of this committee. This decrease has not continued so far in 1938, but additional efforts now are being made to stop these accidents.

The Secola Chapter is sponsored for negro employees and has approximately 300 members. The operation of this chapter is similar to that of the Stanacola Chapter, but meetings are held every 2 months. The chapter has been reorganized after an inactive period, but is again becoming an effective organization.

The "Spotlight"

The "Spotlight" is a mimeographed magazine of 10 or 12 pages published bi-monthly by the safety department for distribution among employees. It contains accounts and sketches of accidents, reports of first-aid contests and training, and other matters relating to safety.

The "Stanacolan"

The "Stanacolan" is a printed paper published biweekly by the company for employees. It is well-edited and contains interesting items and photographs of activities of the refinery. Although it is not published specifically for safety, considerable space in each issue is devoted to safety activities. It, therefore, plays an important part in the safety movement of the refinery by keeping employees informed of safety progress, thus helping to keep them "safety conscious."

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Safety Advertising in the Refinery

There are between 40 and 50 bulletin boards scattered throughout the plant in the different departments. Posters are obtained through the National Safety Council and are changed once a month by the safety inspector. Many of the boards also have the department's accident record posted.

There are also several signs of a permanent nature relating to safety. The outstanding and probably most effective of these is a large wooden thermometer situated at the site of the main road in the refinery. It is marked off in degrees, and above the 85° mark is a cigar. Each day the plant operates without a lost-time accident, the red column rises 1°, and if the 85th day is reached, the cigar lights. This means that the company will give each employee a free cigar. If a lost-time accident occurs, the red column drops to zero. It is then necessary to build up the record again. With the number of man-hours of exposure considered, 85 consecutive days without a lost-time accident is a good record, so good that cigars are not given away frequently. When the thermometer was first used it was one of 50°, which represented the best accident experience up to that time. It was changed later to 85°, as this represents a good average experience, although the refinery has had an experience of 145 consecutive days without a lost-time accident based on the rules of the National Safety Council Competition.

Another sign that attracts considerable attention is a painted board on which is illustrated the manner in which the last lost-time accident occurred. Below the picture is printed a recommendation for preventing a similar accident.

Safety Equipment

The proper use of safety equipment has resulted in a reduction of certain accidents. The equipment is stored and inspected periodically in the refinery goggle shop and certain persons are responsible for maintaining it in safe condition. Supervisors exercise care to see that this equipment is used when conditions warrant.

Each man in the mechanical department is supplied with a pair of goggles, and there are few eye injuries in the plant. There has also been a marked decrease in the number of head injuries since the introduction of hard hats. The company has supplied and now has in use 1,020 of these hats. There are 87 salt tablet dispensers at different locations in the refinery, and employees are educated to use them with the result that cases of heat exhaustion have been materially reduced. Gas masks of canister and fresh-air hose types are in more or less continual use in some place or places in the plant as conditions require; the refinery has 236 canister masks and 44 fresh-air hose masks. There are also 220 safety belts in fairly continual use. Safety shoes are sold extensively to employees at cost price.

Fire equipment and extinguishers are inspected and maintained by the fire department.

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Safety Rules

A book of 102 pages that will fit easily into the hip pocket contains the safety and operating rules of the company. These books are distributed to supervisors who are charged with the responsibility of directing efficiently the men under their supervision and seeing that they follow the safe practices outlined in the published rules.

Accident Records

A complete record of accident statistics and minutes of safety meetings and activities is kept on file in the safety department. The progress of safety work can be determined only by keeping accurate statistics, and the results at the Baton Rouge refinery are shown in table 1 which gives frequency rates since 1919 and severity rates since 1923. It will be noted that there was almost a continual and gradual improvement to the end of 1937. The increase in number of minor accidents since 1933 is attributed to the fact that these accidents are reported more extensively than in past years.

TABLE 1. - Standard Oil Co. of Louisiana, Baton Rouge, La.

Year	Frequency rate	Severity rate	Number of lost-time accidents	Number of minor accidents	Man-hours of exposure
1919...	34.35				7,028,440
1920...	68.42				8,725,440
1921...	41.42				9,680,968
1922...	31.24				9,602,128
1923...	22.16	3.47	231		10,422,001
1924...	13.67	.82	134		9,795,432
1925...	12.14	.76	141		11,612,840
1926...	13.25	1.50	169		12,748,720
1927...	8.71	3.82	104		11,941,920
1928...	11.27	3.06	133		11,979,312
1929...	8.45	1.40	102		12,186,608
1930...	6.03	.46	73		12,097,336
1931...	3.57	2.06	31		8,674,915
1932...	3.56	7.61	23	1,913	6,447,048
1933...	3.36	.198	19	1,578	5,643,630
1934...	5.28	1.226	33	1,959	6,240,498
1935...	2.94	2.348	20	2,269	6,795,706
1936...	2.78	0.992	21	2,345	7,296,820
1937...	3.08	0.239	23	2,523	7,453,730

Table 2 compares accident experience by departments for 1937 and is included in the report to show the manner in which accidents are summarized for 6 months and annual periods.

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TABLE 2. - Comparison of accident experience by departments, January 1 to December 31, 1937 1/

Departments	1937 - Number disabling injuries	1936 - Number disabling injuries	Man-hours 1937	Frequency rate 1937	Frequency rate 1936	Number of days without a disabling injury to January 1, 1938	Severity rate 1937	Severity rate 1936	Number minor injuries 1937	Number minor injuries 1936	Last disabling injury month and year
Process operating division											
Oil move...	0	1	410,660	-	2.47	406	-	0.08	88	92	Nov. 20, 1936
Hydro.....	1	0	172,910	5.78	-	282	0.08	-	21	15	Mar. 24, 1937
Utility....	0	0	144,890	-	-	2,954	-	-	25	39	Nov. 29, 1929
Cr. coils..	1	0	268,300	3.72	-	199	.02	-	34	42	June 15, 1937
Par. & Lube	2	3	856,300	2.33	3.59	164	.15	.19	324	279	July 20, 1937
Jasco.....	1	0	124,280	8.04	-	334	.08	-	47	48	Jan. 26, 1937
Refinery...	1	1	515,330	1.93	1.72	202	.04	.52	100	92	June 12, 1937
Mechanical division											
Carp. & ptr.	0	0	215,760	-	-	1,493	-	-	132	138	Nov. 29, 1933
Masons.....	0	0	108,760	-	-	2,425	-	-	25	45	May 12, 1931
Electrical.	2	0	143,470	13.94	-	42	1.94	-	99	63	Nov. 19, 1937
Gen. labor.	4	3	799,260	5.04	4.54	73	.94	9.21	288	245	Oct. 19, 1937
Bl. makers.	1	1	327,740	3.05	3.05	86	.07	.08	193	194	Oct. 6, 1937
Pro.-Mech..	0	1	89,100	-	10.15	589	-	1.82	35	52	May 21, 1936
Machinists.	2	2	312,480	6.39	6.71	35	1.07	.21	222	220	Nov. 26, 1937
Pipefitters	1	2	701,070	1.42	2.64	345	.06	.04	409	379	Jan. 20, 1937
Service division											
Dev. & res.	0	0	359,260	-	-	1,476	-	-	85	79	Dec. 16, 1933
Sal. & recl.	0	0	50,280	-	-	823	-	-	16	20	Sept. 30, 1935
Police.....	0	0	101,160	-	-	1,823	-	-	9	16	Jan. 3, 1933
Meter & in.	0	0	103,700	-	-	2,314	-	-	22	15	-
Fire.....	1	0	42,140	23.73	-	284	1.13	-	8	8	Mar. 22, 1937
Inspection.	0	0	35,500	-	-	2,354	-	-	7	8	-
Storehouse.	0	0	42,300	-	-	3,123	-	-	8	10	June 13, 1929
Railroad...	0	0	90,360	-	-	1,145	-	-	96	88	Nov. 12, 1934
Ref. lab...	0	1	211,420	-	5.19	676	-	.54	91	91	Feb. 24, 1936
Lighterage.	5	5	515,200	9.70	10.26	122	.28	.38	101	78	Aug. 31, 1937
Departments not in contest											
Accounting.	0	0	378,370	-	-	-	-	-	38	4	-
Terminals..	1	1	54,130	18.47	12.45	139	.07	.32	-	-	Sept. 13, 1937
Misc.....	0	0	279,600	-	-	-	-	-	-	-	-
Total ref..	23	21	7,453,730	3.08	2.87	35	.239	.992	2,523	2,345	Nov. 26, 1937
Lighterage.	5	5	515,200	9.70	10.26	122	.28	.38	101	78	Aug. 31, 1937
TOTAL MFG..	18	16	6,938,530	2.59	2.34	35	.235	1.036	2,422	2,267	Nov. 26, 1937

1/ Departments are grouped in three safety contest divisions: process operating, mechanical, and service.

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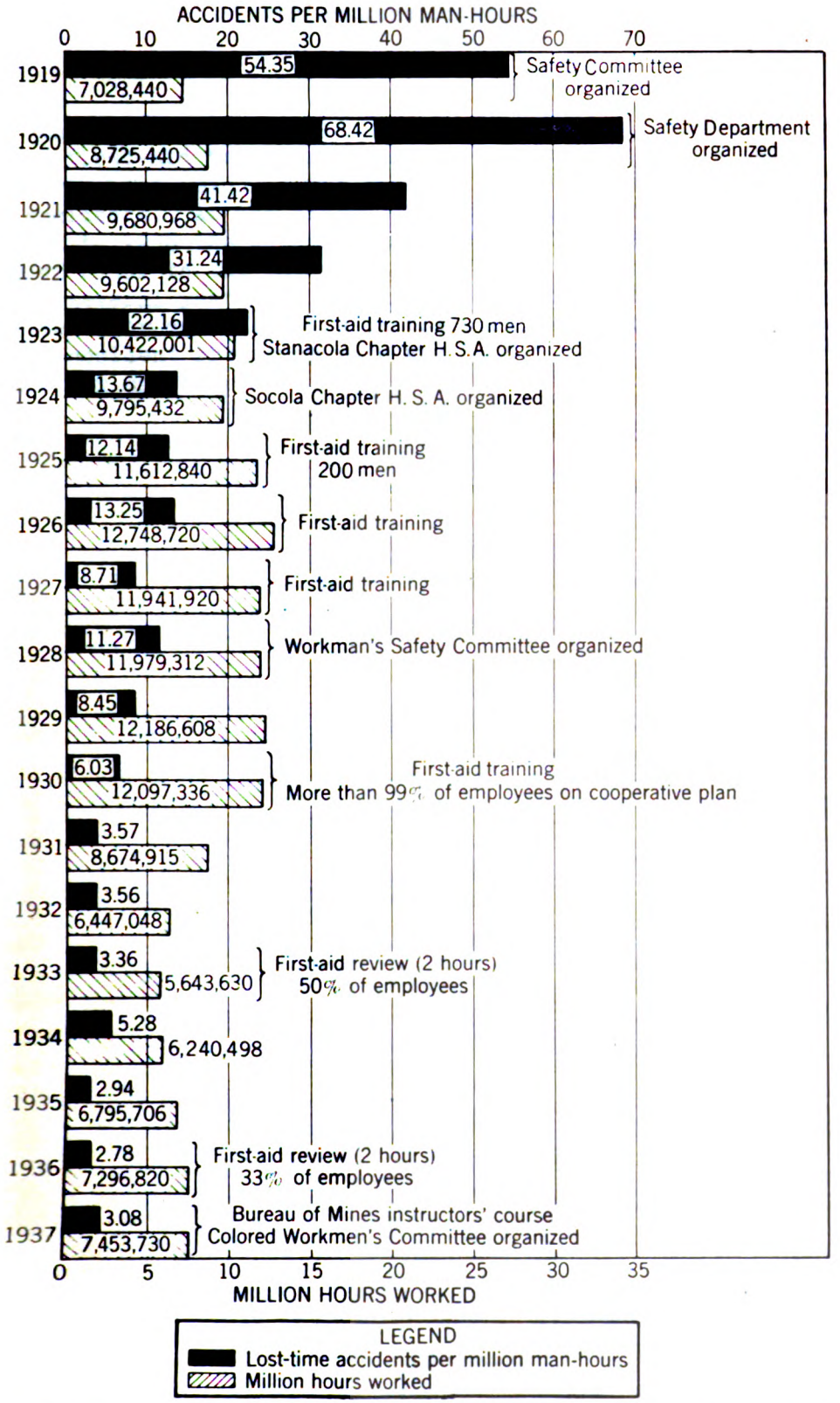
ACCIDENTS PER MILLION MAN-HOURS
0 10 20 30 40 50 60 70
1919 54.35 7,028,440 Safety Committee organized
1920 68.42 8,725,440 Safety Department organized
1921 41.42 9,680,968
1922 31.24 9,602,128
1923 22.16 10,422,001 First-aid training 730 men Stanacola Chapter H.S.A. organized
1924 13.67 9,795,432 Socola Chapter H. S. A. organized
1925 12.14 11,612,840 First-aid training 200 men
1926 13.25 12,748,720 First-aid training
1927 8.71 11,941,920 First-aid training
1928 11.27 11,979,312 Workman's Safety Committee organized
1929 8.45 12,186,608
1930 6.03 12,097,336 First-aid training More than 99% of employees on cooperative plan
1931 3.57 8,674,915
1932 3.56 6,447,048
1933 3.36 5,643,630 First-aid review (2 hours) 50% of employees
1934 5.28 6,240,498
1935 2.94 6,795,706
1936 2.78 7,296,820 First-aid review (2 hours) 33% of employees
1937 3.08 7,453,730 Bureau of Mines instructors' course Colored Workmen's Committee organized
0 5 10 15 20 25 30 35
MILLION HOURS WORKED
LEGEND
Lost-time accidents per million man-hours
Million hours worked

Figure 1.- Accident frequency, Baton Rouge refinery, Standard Oil Co. of Louisiana.

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Figure 1 gives the accident frequency rates from 1919 to 1937, and the year some of the safety activities were introduced.

CONCLUSIONS

This report describes an extensive safety program. There is little question that first-aid training is the most effective single factor in that program; nevertheless, each of the other activities plays a part in the reduction of accidents. As the program was enlarged a reduction in accidents continued, and in 1938 the Joseph A. Holmes Safety Association awarded a Certificate of Honor to the Baton Rouge refinery "for continued safety in operation for several years and having operated through the year 1937 with an accident severity rate of 0.239 in the performance of 7,453,730 man-hours of work. The accident frequency rate was 3.08." Such a record is one of which any company may be proud.

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